



Contribution ID: 1170 Contribution code: WEPS07

Type: **Poster Presentation**

Particles and photon attenuating behavior of lead free Eu^{3+} doped barium phosphate glass system

Wednesday, 22 May 2024 16:00 (2 hours)

The study investigates the radiation attenuation performance of five ternary glass systems with varying chemical compositions: $50\text{P}_2\text{O}_5-(50-x)\text{BaO}-x\text{Eu}_2\text{O}_3$, where $x = 0, 1, 2, 4,$ and 6 mol%. It utilizes theoretical and Monte Carlo methods to determine shielding parameters such as attenuation coefficients, mean free path, value layers, electron densities, conductivity and neutron removal cross-sections across an energy range from 1 keV to 100 GeV. In addition to these analyses, the study explores kinetic energy stopping potentials and projected ranges of ions (H^+ , He^+ , and C^+) through the Stopping and Range of Ions in Matter database. Furthermore, research evaluates the dose rate attenuation behaviour and trajectories of photons bombarded from ^{137}Cs and ^{60}Co sources using Particle and Heavy Ion Transport code System. Obtained results show that sample: $50\text{P}_2\text{O}_5-44\text{BaO}-6\text{Eu}_2\text{O}_3$ with higher Eu^{3+} -doped glass has a potential for radiation shielding application among selected samples and is comparable with previously recommended, tested polymer and glass samples.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Asia

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Session Classification: Wednesday Poster Session

Track Classification: MC4: Hadron Accelerators: MC4.T01 Proton and Ion Sources